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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/711,460

09/20/2004

Anil K. Chinthakindi

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INTERNATIONAL BUSINESS MACHINES CORPORATION

DEPT. 18G

BLDG. 300-482

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HOPEWELL JUNCTION, NY 12533

EXAMINER

HOANG, TU BA

ART UNIT

PAPER NUMBER

2832

DATE MAILED: 06/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

11A

**Office Action Summary**

Application No.

10/711,460

Applicant(s)

CHINTHAKINDI ET AL.

Examiner

Tu Ba Hoang

Art Unit

2832

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____   |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>09/20/04</u> .  | 6) <input type="checkbox"/> Other: ____                                     |

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a seed layer (or seed layer of TiN with a cubic structure) that control the crystal structure of the main layer (or the TaN main layer) as described in [para 16] and [para 17], does not reasonably provide enablement for “second crystal structure is controlled by the first crystal structure” as recited in claims 1 and 14. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. It is noted that as previously indicated, the specification has only described that in order for the seed layer of TiN controls the crystal structure of the main layer of TaN, a thin seed layer of TiN is put down first with a cubic structure to control the crystal structure of the main layer. Nowhere to find such the crystal structure of the second layer (i.e. of TaN) is controlled by the first crystal structure of the first layer (i.e., of TiN). Nowhere to find such “crystal structure is controlled by other such crystal structure” or any indication that the such “cubic structure” (as noted in [para 17]) is in fact a “crystal structure”. See in re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1998) and also also MPEP § 2164.01(a) and § 2164.04.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-20 are also rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 11, and 14 are indefinite for reciting "said second crystal structure is controlled by the first crystal structure" since there is no cooperative relationship between the two. The claim appears to be incomplete for omitting essential elements in order to provide such controlling function or essential structural cooperative relationships between the two first and second layers, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01

In claim 5, there are insufficient antecedent bases for "said TiN" recited at line and "said TaN" recited at line 3 in the claim or from the preceding claim since other materials may be selected instead of Tin and TaN.

In claim 7, there is insufficient antecedent basis for "said TaN" recited at line 1 as for the same region set forth in claim 5 above.

In claim 11, the recitation of "rho" at line 9 also renders the claim indefinite. Does it intend for "sheet of resistivity"? If so, "rho" must be spelled as "sheet of resistivity".

In claim 14, there is insufficient antecedent basis for "said first resistive material" recited at line 4 in the claim. It is appeared that the word "material" is missing after "first resistive". The recitation of "TCR" at line 7 also renders the claim indefinite. Should it be

"temperature coefficient of resistance"? Clarification is needed or the term "TCR" must be spelled out.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 14 as being best understood are rejected under 35 U.S.C. 102(b) as being anticipated by Holmes (US 3,896,284). Holmes shows an integrated circuit with thin film resistors and method of forming thereof comprising a substrate 10, a first seed layer 11 of a first resistive material is deposited or provided on the substrate with a first thickness and a first crystal structure (i.e., cubic structure), a second layer 12 of a second resistive material different from the first resistive material is deposited or provided on the substrate above at least the first layer 11 as clearly shown in Figure 1, wherein the sheet resistivity and temperature coefficient of resistance of the second layer 12 is effectively "controlled" or "realized" by the thickness and cubic structure of the first layer and both first and second layers 11,12 can be trimmed or patterned with at least the first layer forming two pads as shown in Figures 2-3.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4, 11, and 18 rejected under 35 U.S.C. 103(a) as being unpatentable over Holmes in view of admitted prior art noted in [para 70] of the specification. Holmes discloses all of the claimed features except for the second layer of resistive material is not formed over at least a selected one of the two pads, whereby a single layer resistor is formed from the selected one of the pads (i.e., the second layer is patterned or removed from the first layer to expose the first layer at the location of the selected pad). As admitted by the applicant, the films can be etched to form patterns or to be patterned

to remove the Tan (i.e., the second layer) selective to the TiN (i.e., the first) is conventional, well known. It would have been obvious to one having ordinary skill in the art at the time the invention was made to etch the second layer 12 selective to the first layer of Holmes by etching as taught in [para 70] in order to expose the first layer if so desired to form patterns in the form of two pads whereby a first type of resistor formed from a bi-layer of the first and second layers and a second type of resistor formed from the first layer only.

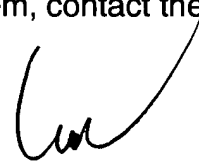
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Banks (US 3,607,384), Wojnarowski et al (US 5,675,310 and US 5,849,623).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu Ba Hoang whose telephone number is (571) 272-4780. The examiner can normally be reached on Mon-Thu from 6:00AM to 6:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tu Ba Hoang  
Primary Examiner  
Art Unit 2832

May 18, 2006